CLAIMS

What is claimed is:

1. A method for controlling a magnetic actuator within a power switching device, the device including a magnetic actuator having a coil and an armature, the method comprising:

inputting a power signal; and

applying a series of modulated current pulses through the coil of the magnetic actuator in a first direction such that the actuator moves from a first position to a second position.

2. The method of claim 1 further comprising:

applying a series of modulated current pulses through the coil of the magnetic actuator in a second direction such that the actuator moves from the second position to a third position.

3. The method of claim 2 wherein the third position is the first position.

4. The method of claim 1 further comprising:

measuring a current value in the coil while pulsing the coil; and

comparing the current level with a threshold value.

5. The method of claim 4 further comprising:

determining, based on the comparison, whether to continue applying a series of modulated current pulses through the coil of the magnetic actuator in a first direction such that the actuator moves from a first position to a second position.

6. The method of claim 1 further comprising:

tuning the series of modulated current pulses.

7. The method of claim 6 wherein tuning the current pulse comprises changing the amplitude and duration of at least one of the modulated current pulses.

8. A power switching control device for controlling a magnetic actuator within a power switching device

a power supply;

a microprocessor;

at least one actuator drive circuit connected to a power switching device and adapted to provide a series of modulated current pulses to the magnetic actuator within the power switching device.

9. The power switching control device of claim 8 wherein the current pulse is tunable.

10. The power switching control device of claim 9 wherein the control device has a low setting, a medium setting and a high setting for the tunable current pulses.

11. The power switching control device of claim 8 wherein the power switching control device is a recloser controller and the power switching control device is a recloser.

12. The power switching control device of claim 8 wherein the power supply is a direct current power supply.

13. The power switching control device of claim 8 wherein the power supply is an alternating current power supply.

14. The power switching control device of claim 8 wherein the power switching control device comprises three actuator control circuits.

15. The power switching control device of claim 8 wherein the power supply is programmable between 150 and 250 VDC.

16. The power switching control device of claim 8 further comprising:

a controller housing; and

an energy storage capacitor contained within the controller housing for storing the energy to be delivered to the magnetic actuator.

17. A method for determining a characteristic of a power switching device including a magnetic actuator having a coil and an armature, the method comprising:

applying a series of modulated current pulse through the coil for a predetermined interval of time;

measuring a current value in the coil during a portion of the predetermined interval of time;

determining an impedance value for the coil based on the current value;

comparing the impedance value for the coil to a threshold impedance value for the coil; and

determining, based on the comparison, the characteristic of the magnetic actuator.

18. The method of claim 17 wherein the characteristic of the magnetic actuator is the position of the armature in the magnetic actuator.

19 The method of claim 17 wherein the characteristic of the magnetic actuator is the condition of the coil.

20. The method of claim 17 wherein the predetermined interval of time is about 230 microseconds.

21. The method of claim 17 wherein measuring the current value in the coil comprises measuring the current value at about 200 microseconds.

22. The method of claim 17 wherein the threshold value is programmable by the user.

23. The method of claim 17 wherein the threshold value is stored in a memory of the power switching device controller.

24. A power switching device system comprising:

a power switching device having a magnetic actuator including a coil and an armature; and

a power switching device controller adapted to apply a voltage across the coil for a predetermined interval of time, measure a current value in the coil during a portion of the predetermined interval of time, determine an impedance value for the coil based on the current value, compare the impedance value for the coil to a threshold impedance value for the coil and determine, based on the comparison, a characteristic of the magnetic actuator.

25. The power switching device system of claim 24, wherein the characteristic of the magnetic actuator is the position of the armature in the magnetic actuator.

26. The power switching device system of claim 24, wherein the characteristic of the magnetic actuator is the condition of the coil.

27. The power switching device system of claim 24, wherein the power switching device controller comprises:

memory for storing data;

a microprocessor; and

a voltage regulator electrically connected to the microprocessor, the voltage regulator adapted to switch between a linear mode and a switching mode.

28. A regulator for regulating voltage within a power switching device control device, the regulator operable in a switching mode and a linear mode, the regulator comprising:

an input power supply;

a transistor having a first, a second, and a third terminal;

an inductor disposed between the input power supply and the transistor, one end of the inductor in electrical connection with the first terminal of the transistor;

a capacitor disposed in a parallel connection with the transistor, one end of the capacitor being in electrical connection with the one end of the inductor and the other end of the capacitor being in electrical connection with an output terminal; and

the output terminal in electrical connection the third terminal of the transistor.

29. The regulator of claim 28, wherein when the regulator operates in linear mode the inductor acts as a conductor and when the regulator operates in switching mode the inductor acts as an oscillator.

30. The regulator of claim 28, further comprising at least one diode coupled between the output terminal and the capacitor.

31. The regulator of claim 30, wherein the diodes rectify the output of the capacitor.

32. The regulator of claim 28, further comprising a microprocessor having a pulse width modulator wherein the microprocessor is coupled between the second terminal and the third terminal of the transistor.

33. The regulator of claim 32, wherein the pulse width modulator pulses the second terminal of the transistor.

34. A method for regulating an input power signal using a regulator operable in a switching mode and a linear mode for outputting a regulated output power signal in a power switching device control device, the method comprising:

receiving an input power signal having a first voltage;

regulating the input power signal to a second voltage;

outputting a regulated output signal at the second voltage;

determining, based on the regulated output signal, whether to operate the regulator in switching mode or a linear mode.

35. The method of claim 34 wherein receiving an input power signal having a first voltage comprises receiving an input power signal having a voltage of 250 VDC.

36. The method of claim 34 wherein outputting a regulated output signal at the second voltage comprises outputting a regulated output signal at a voltage of 15 VDC.

37. The method of claim 34 further comprising rectifying the input power signal prior to outputting the regulated output signal at the second voltage.